Statement was cited in a search report for a corresponding British patent application. This Information Disclosure Statement is submitted pursuant to 37 CFR § 1.97(c). Authorization is included herewith to charge the fee of $180.00, as provided in CFR § 1.17(p) to Deposit Account 50-2223.

2.   Status of the Claims

Claims 1-14, 16-18 and 20 remain pending in the application. Claims 1, 4, 7, 10, 13 and 20 are independent.

3.   Claim Rejections – 35 U. S. C. § 102(b)

Claims 1-14, 16-18 and 20 stand rejected as anticipated by Willhoit, Jr. (U. S. patent no. 5,671,136). The rejection is traversed for the reasons which follow. The traverse of the rejection of the Applicant's claims is based on two grounds. First, it is believed that all the elements of the Applicant's independent claims are not shown in the '136 patent. Second, to the extent it can be argued that the individual elements of the Applicant's claims are in fact shown in the '136 patent, such elements are not shown in combination as recited in the Applicant's claims.

As to the issue of whether all the elements in the Applicant's claims are shown in the '136 patent, a brief summary of claim 1 is presented here to help the explanation. Applicant's claim 1 recites a method for identification of primary events in seismic data. The method of claim 1 includes sorting the data by frequency, wherein a frequency sorted data gather results. In the frequency sorted gather, at least some non-primary events are separated from primary events. The method of claim 1 then includes attenuating amplitudes above a preselected base amplitude in the frequency sorted gather, applying a coherency filter to the frequency sorted gather to identify coherent events, and replacing the attenuated amplitudes with the coherent event amplitudes.

"Coherency filtering" recited in claim 1 is disclosed at col. 7 lines 24 and 25 of the '136 patent. However, the coherency filtering disclosed in that part of the '136 patent is explained as an individual process step to be performed for the purpose of increasing the reflection continuity of two way travel time to layered subsurface structures. See the '136 patent at col. 7, lines 32-35. The disclosure in this part of the '136 patent, however, does not recite that coherency filtering is performed on a frequency-sorted trace gather as recited in Applicant's claim 1. Further, the '136 patent does not disclose any subsequent replacement of amplitudes in

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an attenuated amplitude, frequency sorted gather with amplitudes obtained from the coherency filter, as recited in Applicant's claim 1. Applicant respectfully notes that the coherency filtering recited in the '136 patent at col. 7, lines 24-25 is a separate and distinct process element, and is not disclosed in any combination such as in any of the Applicant's claims. Therefore, while the individual element "coherency filtering" is disclosed in the '136 patent, such disclosure has no relationship to a combination of elements resulting in a process as recited in the Applicant's claims. Therefore the Applicant believes that the '136 patent does not disclose "coherency filtering" within the scope of the element as recited in the Applicant's claim 1.

The '136 patent discloses, at col. 15, lines 10-17, time domain spectral balancing, which appears to have been cited in the Office Action to be the same as frequency sorting recited in Applicant's claim 1. Time domain spectral balancing in the '136 patent does include separation of seismic signals into discrete frequency-content bands, as recited at col. 15, lines 12-17. However, the resulting frequency-band separated data are not then arranged by frequency into a "frequency-sorted gather", as recited in Applicant's claim 1. Reading further in the '136 patent at col. 15, lines 19-33, the RMS amplitudes of the frequency filtered data are balanced, such as using automatic gain control (AGC) and then summed to produce frequency balanced time domain data. This is completely unlike the process performed on the data in Applicant's claim 1, wherein the frequency sorted data gather is then attenuated where amplitudes exceed a selected base level. The Applicant therefore believes that the element "frequency sorting resulting in a frequency sorted gather" is not disclosed in the '136 patent. Even if, for the sake of argument (and the Applicant does not admit as much here) it is assumed that the frequency separation performed on data as disclosed in the '136 patent results, however temporarily, in a frequency-sorted data gather, there is no subsequent disclosure in the '136 patent that suggests, states or implies that selected amplitudes are attenuated in the frequency sorted gather. In fact, the specific step performed on the frequency-separated data as disclosed in the '136 patent is to normalize the amplitudes across the spectrum, rather than attenuate amplitudes above a selected base amplitude as recited in Applicant's claim 1.

Col. 18, lines 15-27, which appears to have been cited as disclosing identification of coherent events, recites normal moveout (NMO) of all primary reflection wavelets in a common mid point (CMP) trace gather (see col. 18, lines 15-17), so that a subsequent stack of the NMO corrected data enhances amplitudes of the primary events and attenuates amplitudes of multiple

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reflection events. Nothing in the Applicant's claims recites NMO correction, so this portion of the '136 patent does not appear to be relevant to the Applicant's claims. However, to the extent it is believed that this portion of the '136 patent discloses "identifying coherent events", it is noted that coherency filtering as recited in the Applicant's claim 1 is performed on a frequency sorted gather in which amplitudes above a selected threshold have been attenuated.

The '136 patent at col. 13, lines 47-64 explains methods known in the art for static correcting seismic data, including correction for recording geometry, and muting of early (shallow) time events on the traces that are unlikely to have resulted from any subsurface reflective event. While muting is in fact a form of attenuation above a selected base amplitude (the base being zero amplitude!), such attenuation is not applied to a frequency-sorted data gather as recited in Applicant's claim 1. To the extent the Applicant's recited attenuating is similar to muting, it should be noted that the "selected base amplitude" recited in the Applicant's claim includes non-zero amplitudes, which is different from muting.

Finally, it was stated in the Office Action that the '136 patent at col. 21, lines 30-36 discloses replacing attenuated amplitudes in a frequency sorted gather with amplitudes from coherent events. This statement is respectfully traversed. The cited section of the '136 patent deals with "static busts" (line 45), which are identifiable by displaying traces either as variable intensity or variable area wiggle traces, and at a compressed trace spacing and looking for tell tale vertical alignment of processing artifacts. Nothing in the cited section of the '136 patent mentions amplitude substitution from coherent events into a frequency sorter gather in which amplitudes have been attenuated.

The Applicant therefore believes that a number of the individual elements recited in claim 1 are not in fact disclosed in the '136 patent. However, the Applicant also respectfully notes that mere disclosure of elements recited in a claim in a single reference is not sufficient to anticipate the claim in question if the claimed combination is not shown in the reference. Applicant admits that by using the open format ("comprising") in his claims that additional elements may be shown in a reference beyond the claimed combination, while still anticipating the claim. However, the combination must still be present in the reference in question. The Applicant respectfully notes that the combination of elements, having the stated result as to intermediate acts in the claim and the ultimate result of the claim are neither shown not fairly implied by the '136 patent. The elements of claim 1 purportedly shown in the '136 patent have

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no disclosed interrelation that causes any intermediate or ultimate result that is remotely similar to the elements recited in the Applicant's claim 1. Support for the Applicant's position with respect to elements in a claim can be found in MPEP § 2106 (II) (C) (p. 2100-9, col. 2. last paragraph, August 2001). The claim cannot be dissected into discrete elements and then evaluated in isolation but the claim must be evaluated as a whole. "This is particularly true in a process claim because a new combination of steps in a process may be patentable even though all the constituents of the combination were well known and in common use before the combination was made." *Id.* Therefore, the Applicant believes that claim 1 is patentable over the art of record.

Claims 2 and 3 depend from claim 1 and are patentable for at least the same reasons advanced with respect to claim 1.

Claim 4 recites a method for identifying primary events in seismic data, including sorting the data by frequency such that at least some primary events are separated from non-primary events as a result of the frequency separation. As explained above with respect to claim 1, frequency sorting, to the extent disclosed in the '136 patent, is used to normalize the spectral content of the seismic data and not to identify primary and non-primary events. Applicant's claim 4 then recites that a coherency filter is applied to the events in the frequency sorted data, such that coherent ones of the events are identified, and finally, amplitudes in the frequency sorted data that are above a selected base amplitude are attenuated when these amplitudes are not associated with coherent events. As explained above with respect to claim 1, the '136 patent does not disclose or suggest sorting data by frequency and then attenuating amplitudes which are above a selected base or threshold amplitude in the frequency sorted gather. To the extent any "muting" as disclosed in the '136 patent is performed, it is performed on "whole band" (time domain) seismic trace data and not on frequency sorted data. For at least these reasons, the '136 patent does not anticipate claim 4. The Applicant therefore believes that claim 4 is patentable over the '136 patent. Claims 5 and 6 depend from claim 4 and are patentable for at least the same reasons advanced with respect to claim 4.

Claim 7 recites a system for identifying primary events in seismic data. The system recited in claim 7 includes means for performing each of the acts recited in claim 1, and therefore corresponds directly to claim 1. Claim 7 is believed to be patentable for at least the same reasons

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advanced with respect to claim 1. Claims 8 and 9 depend from claim 7 and are patentable for at least the same reasons advanced with respect to claim 7.

Claim10 recites a system for identifying primary events in seismic data. The system of claim 10 includes means for performing acts corresponding to method claim 4. Claim 10 therefore corresponds directly to claim 4. Claim 10 is therefore patentable for at least the same reasons advanced with respect to claim 4. Claims 11 and 12 depend from claim 10 and are patentable for at least the same reasons advanced with respect to claim 10.
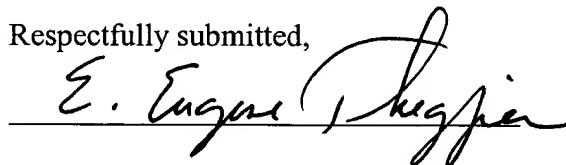
Claim 13 recites a method of identifying primary events in seismic data. The method of claim 13 includes sorting the seismic data according to frequency, applying a coherency filter to the seismic data and selectively attenuating events in the seismic data. The selectively attenuating is dependent upon the frequency and coherency of events identified by the coherency filtering. As explained above with respect to claim 1, the '136 patent does not show or fairly suggest sorting the data by frequency. Nothing in the Office Action cites any portion of the '136 patent that discloses selectively attenuating frequency sorted data depending on the frequency and coherency of events identified by the coherency filtering. Accordingly, claim 13 cannot be anticipated by the '136 patent. Claims 14 and 16-18 ultimately depend from claim 13 and are patentable for at least the reasons advanced with respect to claim 13.

Claim 20 recites a system for identifying primary events in seismic data, in which elements of the system perform substantially the same acts recited in claim 13. Accordingly, claim 20 is patentable for at least the same reasons advanced with respect to claim 13.

The Applicant believes that this paper is fully responsive to each and every ground of rejection cited by the Examiner in the Office Action dated February 3, 2003 and respectfully requests early favorable action on his application.

Respectfully submitted,

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